

ELECTRICAL CONNECTOR AND ADAPTER STRUCTURE WITH RAISED PORTION

CROSS REFERENCE TO RELATED APPLICATIONS

5 This is a CONTINUATION of Application Serial Number
09/657,869, filed September 8, 2000.

 This Continuation claims benefit of the filing date of
Application No. 09/657,869.

10 BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to electrical connector and adapter
15 structures. Such connectors are used in the electronics industry
in cables and adapters and similar devices that connect
components. The invention discloses a connector or adapter
housing structure with a raised portion. When plastic is molded
around the housing, the raised portion is left exposed. This
20 exposed portion of the housing provides a place to incorporate
designs, such as business logos or gripping surfaces.

2. Discussion of the Prior Art

25 The variety of electronics connectors is large, but they
share similarities in their manufacture and assembly. Fig. 1
shows a cross-section of a conventional cable connector 10. The
most common cable connectors have a metal housing 14 with a back

end 19 through which a cable 13 is inserted. A connector plug 12 with pins or receptacles (not shown), designed to plug into the appropriate part on a component (not shown), is attached to the front end 22 of the connector 10. The cable 13 contains 5 electrical conductors or wires 21 which are connected by soldering or crimping to the inward projections 23 of the pins or receptacles. Over the metal housing 14, plastic is injection molded to form an outer plastic covering 11. The plastic covering 11 often terminates around the cable 13 to form a 10 "strain relief" 16 that prevents the cable from bending too sharply.

To provide a place for a manufacturer's name or for part identification, the plastic covering 11 of conventional 15 connectors is sometimes molded with a recess 20. In the recess 20, identifying logos, designs, words, or numbers are often formed in the molding process, leaving raised or indented surfaces (not shown) in the plastic covering 11. Or, a label (not shown) can be affixed in the recess 20 after molding. Some 20 designs have a raised surface design by placing the cable connector 10 or adapter in a second injection mold and adding a second plastic surface 15. This two-step molding process allows different colors or textures of plastic to be used.

25 Recent designs use transparent plastic in the molded plastic covering 11, so that the parts and surfaces below, such as the housing 14, can be seen. This design has been popularized by the Macintosh "iMac" computers. The iMac products use transparent

plastic outer shells or materials to show the parts and surfaces below. Computer connector and adapter assemblies have been created that mimic this feature. However, the transparent plastic surfaces do not provide a surface on which logos or

5 information can be easily discerned. To solve this problem, some connectors and adapters have identifying logos or information incorporated onto the metal housing 14, so that the logos or information may be seen beneath the transparent plastic covering

11. But the result is imperfect, since the transparent plastic

10 obscures the housing surface and design below.

Similar structures are used for other connector shapes, such as cylindrical connectors, and for adapters.

15 SUMMARY OF THE INVENTION

The present invention provides a connector or adapter housing structure that provides a raised portion that will be exposed after the outer plastic covering is molded onto the

20 connector or adapter. This raised portion of the housing exposes an area where logos or other information can be placed on or molded into the raised portion. This eliminates the need to apply a logo through a second injection molding process or by affixing it in a later manufacturing step. The raised portion

25 also provides a more discernable and durable surface for logos than the molded plastic covering. Moreover, with transparent plastic coverings of recent designs, the raised portion of the present invention provides the best surface for logos or other

information. In this way, a cable connector or adapter can be manufactured and assembled with fewer parts and steps, and the finished product will provide a superior surface for logos and information.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-section view of a prior art cable
10 connector.

Fig. 2 is a cross-section view of a cable connector
according to the present invention.

15 Fig. 3 is a three-quarter view of a cable connector
according to the present invention.

Fig. 4 is a cross-section view of an adapter according to
the present invention.

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DESCRIPTION OF THE INVENTION:

The embodiments of the invention, described in detail below,
use the same numbers shown in the Fig. 1 drawing of the prior art
25 connector to designate similar elements or structures. Moreover,
similar elements or structures shared with adapters, as shown in
Fig. 4, are also designated with the same numbers used for the
connectors shown in Fig.'s 2 and 3.

Fig. 2 shows one embodiment of the present invention applied to a computer cable connector assembly. A conventional connector plug 12, with pins or pin receptacles (not shown), is designed to be plugged into a conforming port in a component (not shown).

5 The connector plug 12 is attached to the housing 14. The housing 14 is most commonly a metal structure intended to provide electromagnetic shielding to the electrical conductors 21 within. Conventional housings are sometimes formed from more than one piece, such as upper and lower halves (not shown), or as one

10 piece. The embodiment shown in Fig. 2 shows a single-piece, molded metal housing 14. A cable 13, having several electrical conductors or wires 21, enters the housing 14 through a back end 19. The drawings show only two conductors 21, but this is merely illustrative; usually, more conductors 21 are involved. The

15 conductors 21 are connected to the inward projections 23 of the pins or receptacles (not shown) by soldering or crimping.

A raised portion 17 of the housing 14 extends above the outer surface of the housing 14. In the embodiment shown in Fig. 2, the raised portion 17 is formed as part of the molded metal housing 14. It is also contemplated that the raised portion 17 could be applied to the housing 14 in other ways. For example, the raised portion 17 could be glued or soldered to the housing 14, or the raised portion 17 of the housing 14 could be formed as part of a stamping process. In any event, persons skilled in the art will recognize that a raised portion 17 may be incorporated into or formed onto a housing 14.

Once the connector 12, housing 14, and cable 13 are assembled, plastic is usually injection molded over the assembly to form an outer plastic covering 11. According to the present invention, the raised portion 17 will not be covered by the 5 injection molded plastic covering 11, but will be exposed. The raised portion 17 may be higher than the outer covering 11, or it may even be a little lower, but the idea is that it is exposed after the outer covering 11 is placed over the housing.

10 The raised surface 17 provides a place where logos or information may be placed. For example, Fig. 3 shows a completed cable connector with a logo 18 molded into the raised portion 17. Thus, after manufacturing and assembly, the cable connector will have a clearly visible area on the raised portion 17, not covered 15 by the injection molded plastic covering 11, where a logo or information may be seen. Also, the raised portion 17 can also provide a surface, above the injection molded plastic covering 11, for a gripping surface (not shown).

20 Fig. 4 shows one embodiment of the present invention applied to a computer adapter assembly. Adapters are used for many purposes in the computer industry, such as adapting one plug configuration to a different plug configuration, or as "gender changers", or to provide adapting circuitry or electronics. An 25 adapter is shown generally at 27. A first conventional connector plug 12, with pins or pin receptacles (not shown), is designed to be plugged into a conforming port in a component or cable (not shown). The first connector plug 12 is attached to the housing

14. The housing 14 is most commonly a metal structure intended
to provide electromagnetic shielding to the electrical conductors
21 within. Conventional housings are sometimes formed from more
than one piece, such as upper and lower halves (not shown), or as
5 one piece. A second conventional connector plug 26 is attached
to the other end 25 of the housing 14. Conductors or wires 23
are connected, usually by crimping or soldering, to extensions 23
from the pins or receptacles (not shown) of the first connector
12. The conductors 23 are then connected, directly or
10 indirectly, to extensions 24 from the pins or receptacles (not
shown) of the second connector 26. In the embodiment shown, the
conductors 23 are wires connected directly from the first
connector 12 to the second connector 26. However, conventional
adapters use many different methods of for making these
15 connections. For example, one common method is to use a printed
circuit board (not shown) between the connectors. Additionally,
adapters sometimes have more than two connectors. The present
invention does not concern the method for providing an electrical
connection between plug connectors of adapters or cable
20 connectors, and the structures shown are merely illustrative.

A raised portion 17 of the housing 14 extends above the
outer surface of the housing 14. In the embodiment shown in Fig.
4, the raised portion 17 is formed as part of the molded metal
25 housing 14. It is also contemplated that the raised portion 17
could be applied to the housing 14 in other ways, as mentioned
above. Once the connectors 12 and 26, housing 14, and conductors
23 are assembled, plastic is usually injection molded over the

assembly to form an outer plastic covering 11. According to the present invention, the raised portion 17 will not be covered by the injection molded plastic covering 11, but will be exposed. The raised portion 17 may be higher or a little lower than the 5 outer covering 11, as described above. As with the cable connector 10 described above, the raised portion 17 of the adapter 27, shown in Fig. 4, may be used as a surface for molded logos or designs 18, labels (not shown), or a gripping surface (not shown).

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The drawings and description set forth here represent only some embodiments of the invention. After considering these, skilled persons will understand that there are many ways to make an electrical connector or adapter structure according to the 15 principles disclosed. The inventor contemplates that the use of alternative structures, which result in an electrical connector or adapter structure using the principles disclosed and the invention claimed, will be within the scope of the claims.